

On the spider species described by L. Koch in 1882 from the Balearic Islands (Araneae)

Robert Bosmans & Johan Van Keer

doi: 10.5431/aramit4306

Abstract: Examination of the L. Koch collection of the Zoological Museum in Berlin allows us to propose the following new synonyms and combinations: *Erigone marina* L. Koch, 1882 = *Oedothorax fuscus* (Blackwall, 1834) **n. syn.**; *Theridion elimatum* L. Koch, 1882 = *Enoplognatha diversa* (Blackwall, 1859) **n. syn.**; *Liocranum variabilis* Wunderlich, 2008 = *Zora inornata* L. Koch, 1882 **n. syn.** = *Liocranum inornatum* **n. comb.**; *Lycosa perspicax* L. Koch, 1882 = *Arctosa fulvilineata* (Lucas, 1846) **n. syn.**; *Alopecosella* Roewer, 1960 = *Arctosa* C. L. Koch, 1847 **n. syn.**; *Lycosa subhirsuta* L. Koch, 1882 = *Arctosa lacustris* (Simon, 1876) **n. syn.**; *Philodromus vegetus* L. Koch, 1882 = *Thanatus vulgaris* Simon, 1870 **n. syn.**; *Ozyptila bicuspis* Simon, 1932 = *Ozyptila furcula* L. Koch, 1882 **n. syn.**; *Haplodrassus maroccanus* Denis, 1956 = *Drassus parvulus* L. Koch, 1882 **n. syn.** = *Haplodrassus parvicorpus* (Roewer, 1951) **n. comb.** (replacement name); *Zelotes rusciniensis* Simon, 1914 = *Zelotes semirufa* (L. Koch, 1882) **n. syn.**; *Phlegra simoni* L. Koch, 1882 = *Phlegra bresnieri* Lucas, 1846 **n. syn.**; *Trochosula conspersa* (L. Koch, 1882), *Lycorma fraisnei* (L. Koch, 1882), *Lycorma insulana* (L. Koch, 1882), *Arctosa misella* (L. Koch, 1992) and *Pirata simplex* (L. Koch, 1882) are all retransferred to their original genus *Lycosa* **stat. rev.** *Cheiracanthium occidentale* L. Koch, 1882, *Ozyptila furcula* L. Koch, 1882 and *Zelotes callidus* (Simon, 1878) are redescribed.

Key words: Balearic Islands, L. Koch, redescrptions, spiders, synonymies

In recent years, the number of descriptions of new species has increased considerably, greatly expanding the knowledge of spiders. However, it is also very important to revise or redescribe species from the 19th century. Some of these older descriptions are incomplete and not accompanied by illustrations, but others have adequate descriptions with excellent figures. One of the papers that has been completely forgotten is 'Zoologische Ergebnisse von Excursionen auf den Balearen. II. Arachniden und Myriapoden' by L. KOCH (1882). The author described 28 new species of spiders in it, of which only ten have been fully redescribed, which means that 18 of them are left as poorly known species.

Material and methods

Type material of nine species could be loaned from the Berlin Museum (possible other locations of type material in London or Vienna were not checked). If the material was not present, the descriptions and figures were carefully examined and compared with similar or related species from the Mediterranean.

The reference material mentioned in the present paper is part of the collection of the first author. Specimens were examined and illustrated using a Wild M5 stereomicroscope. Further details were studied using an Olympus CH-2 stereoscopic microscope with a drawing tube. Left structures are depicted. Male palps were detached and transferred to glycerol for examination under the microscope. Female genitalia were excised using sharpened needles. These were transferred to clove oil for examination under the microscope. Later, palps and epigynes were returned to 70% ethanol.

The following abbreviations are used in the text:

CRB: Collection Robert Bosmans;

MNHNP: Muséum national d'Histoire naturelle, Paris;

ZMB: Zoologisches Museum Berlin

Comments on the species described by L. Koch

Many authors of the 19th or the beginning of the 20th century, for example Thorell and Strand, did not present figures at all, so these species cannot be recognized without examination of the type material. KOCH (1882) reported twenty-eight new spider species from the Balearic Islands. His descriptions are very accurate and were accompanied by excellent figures, which allow the recognition of details in the palpal and epigynal structures. Careful examination of the figures should have allowed identification of several species, especially when compared with

Robert BOSMANS, University of Ghent, Terrestrial Ecology Unit,
Ledeganckstraat 35, 9000 Gent, Belgium.

E-Mail: Rop_Bosmans@pandora.be

Johan VAN KEER, Bormstraat 203 bus 3, 1880 Kapelle-op-den-Bos,
Belgium. E-Mail: johan.van.keer1@telenet.be

other material from the Mediterranean region. It is therefore surprising that L. Koch's paper has been neglected by previous authors. Of the twenty-eight described species, only ten have subsequently been studied. Out of these ten redescribed species, seven appeared to be synonyms, and only *Iberesia brauni*, *Zelotes semirufus* and *Z. flagellans* remain valid. The ten species concerned are listed in Tab. 1.

Twelve of the eighteen remaining species have received new names by preoccupation, were transferred to other genera or were declared *nomina dubia*. However, none of them were redescribed. The other species have never been subsequently cited, except in catalogues. These species are listed in Table 2.

Taxonomy

Family Dysderidae

Dysdera mordax L. Koch, 1882 (Fig. 17)

Dysdera mordax L. Koch, 1882: 640, pl. 20, fig. 20.

Type material

Holotype male of *Dysdera mordax* from Spain, Balears, Mallorca, Palma, beginning of May, Schaufuss leg. (ZMB 7905); examined, but both palps are absent.

Comments

In absence of the palps, a complete new diagnosis of this species cannot be given. In Mallorca, *Dysdera crocata* C. L. Koch, 1838 is the commonest *Dysdera* spe-

cies (authors' personal observations) and the holotype of *Dysdera mordax* was compared with this species. In *D. mordax*, the rugosity of the prosoma and the sternum is different and the colour is more burgundy red. Spination of the holotype may be incomplete, but no spines are observed on legs I and II (probably lost), leg IV has 2 basal spines on the femora, legs III–IV have 2 pairs of lateral spines and 1 pair of ventral spines on the tibia, and several spines on the metatarsi. In *D. crocata* tibiae III–IV have fewer spines. For the male palp we must rely on the figure of KOCH (1882; see Fig. 1). The bulb is similar to that of *Dysdera crocata*, but more slender, narrowing terminally and more pointed. We consider it a valid species, but topotypic material is needed for a complete redescription.

Distribution

So far, the species is an endemic to Mallorca.

Family Theridiidae

Enoplognatha diversa (Blackwall, 1859) (Figs 2–3)

Theridion elimatum L. Koch, 1882: 630, pl. 20, fig. 8; **new synonymy.**

Type material

Holotype female of *Theridion elimatum* from Spain, Balears, Mallorca, Palma Riera, 22 April, Schaufuss leg.; not examined, unavailable in ZMB.

Comments

According to KOCH (1882), the prosoma of this species is yellowish brown, the abdomen grey brown

Tab. 1: List of species described by L. KOCH (1882) which have already been redescribed

Koch's name	Current name	Author(s)
Family Nemesiidae		
<i>Nemesia brauni</i> L. Koch, 1882	<i>Iberesia brauni</i> (L. Koch, 1882)	DECAE & CARDOSO (2006)
Family Theridiidae		
<i>Theridion mansuetum</i> L. Koch, 1882	<i>Enoplognatha mandibularis</i> (Lucas, 1846)	BOSMANS & VAN KEER (1999)
<i>Meta schaufussi</i> L. Koch, 1882	<i>Enoplognatha mordax</i> (Thorell, 1875)	WUNDERLICH in: MERRETT & SNAZELL (1975)
Family Araneidae		
<i>Singa nigrofasciata</i> L. Koch, 1882	<i>Hypsosinga albovittata</i> (Westring, 1851)	DENIS (1952)
<i>Epeira mimula</i> L. Koch, 1882	<i>Neoscona adianta</i> (Walckenaer, 1802)	ROEWER (1942)
Family Lycosidae		
<i>Lycosa subterranea</i> L. Koch, 1882	<i>Arctosa fulvolineata</i> (Lucas, 1846)	LUGETTI & TONGIORGI (1965)
<i>Pardosa venatica</i> L. Koch, 1882	<i>Pardosa cribrata</i> Simon, 1876	WUNDERLICH (1984)
Family Corinnidae		
<i>Trachelas flavipes</i> L. Koch, 1882	<i>Paratrachelas maculatus</i> (Thorell, 1875)	BOSSELAERS et al. (2009)
Family Gnaphosidae		
<i>Prosthesima flagellans</i> L. Koch, 1882	<i>Zelotes flagellans</i> (L. Koch, 1882)	SENGLET (2011)
<i>Prosthesima semirufa</i> L. Koch, 1882	<i>Zelotes semirufus</i> (L. Koch, 1882)	SENGLET (2011)

Tab. 2. List of species that have received new names by preoccupation, were transferred to other genera, were declared *nomina dubia* or were never mentioned again in literature

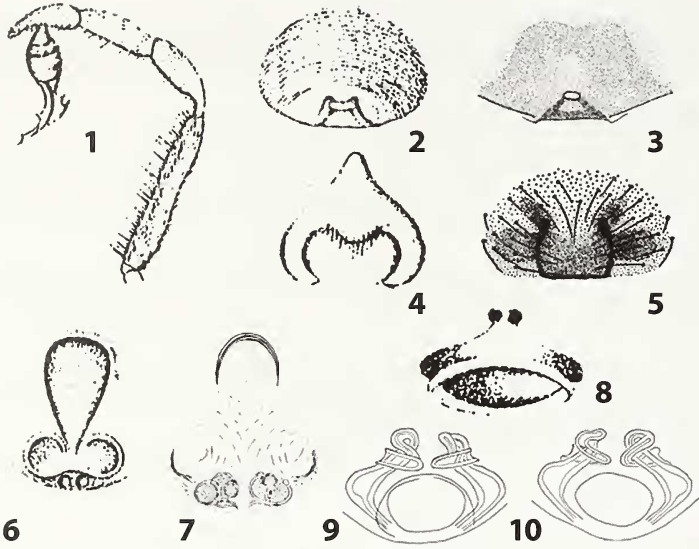
Koch's name	Current name	Action
Family Dysderidae		
<i>Dysdera mordax</i> L. Koch, 1882	<i>Dysdera mordax</i> L. Koch, 1882	None
Family Theridiidae		
<i>Theridion elimatum</i> L. Koch, 1882	<i>Theridion elimatum</i> L. Koch, 1882	None
Family Linyphiidae		
<i>Erigone marina</i> L. Koch, 1882	<i>Erigone marina</i> L. Koch, 1882	None
Family Zoridae		
<i>Zora inornata</i> L. Koch, 1882	<i>Zora inornata</i> L. Koch, 1882	Nomen dubium (URONES 2005)
Family Miturgidae		
<i>Cheiracanthium occidentale</i> L. Koch, 1882	<i>Cheiracanthium occidentale</i> L. Koch, 1882	None
Family Lycosidae		
<i>Lycosa perspicax</i> L. Koch, 1882	<i>Alopecosella perspicax</i> (L. Koch, 1882)	Transfer by ROEWER (1955)
<i>Lycosa subhirsuta</i> L. Koch, 1882	<i>Lycosa subhirsutella</i> Roewer, 1955, but transferred back to <i>Lycosa subhirsuta</i> in ROEWER (1960)	Replacement name, later transferred back
<i>Lycosa conspersa</i> L. Koch, 1882	<i>Trochosula conspersa</i> (L. Koch, 1882)	Transfer by ROEWER (1955)
<i>Lycosa fraisei</i> L. Koch, 1882	<i>Lycorma fraisei</i> (L. Koch, 1882)	Transfer by ROEWER (1955)
<i>Lycosa insulana</i> L. Koch, 1882	<i>Lycorma insulana</i> (L. Koch, 1882)	Transfer by ROEWER (1955)
<i>Lycosa misella</i> L. Koch, 1882	<i>Arctosa misella</i> (L. Koch, 1882)	Transfer by ROEWER (1955)
<i>Lycosa simplex</i> L. Koch, 1882	<i>Pirata simplex</i> (L. Koch, 1882)	Transfer by ROEWER (1955)
<i>Pardosa tenuipes</i> L. Koch, 1882	<i>Pardosa tenuipes</i> L. Koch, 1882	None
Family Philodromidae		
<i>Philodromus vegetus</i> L. Koch, 1882	<i>Philodromus vegetus</i> L. Koch, 1882	Nomen dubium (BRAUN 1965)
Family Thomisidae		
<i>Ozyptila furcula</i> L. Koch, 1882	<i>Ozyptila furcula</i> L. Koch, 1882	None
Family Gnaphosidae		
<i>Drassus parvulus</i> L. Koch, 1882	<i>Drassodes parvicorpus</i> Roewer, 1955	Replacement name
<i>Prosthesima semirufa</i> L. Koch, 1882	<i>Zelotes semirufus</i> (L. Koch, 1882)	Redescription (SENGLLET 2011)
<i>Prosthesima plumigera</i> L. Koch, 1882	<i>Zelotes plumiger</i> (L. Koch, 1882)	Transfer by ROEWER (1954)
Family Salticidae		
<i>Phlegra simoni</i> L. Koch, 1882	<i>Phlegra simoni</i> L. Koch, 1882	None

with a dark folium with white spots and bordered with white, ventrally with two parallel white stripes, legs yellowish brown. The description of such a folium points clearly in the direction of *Enoplognatha* species of the *diversa* or *mandibularis* group. Koch's figure of the epigyne provides further details that point clearly in the direction of *E. diversa* (compare Figs 2-3), the most common *Enoplognatha* species in Spain (BOSMANS & VAN KEER 1999). *Theridion elimatum* L.

Koch, 1882 is therefore considered a junior synonym of *Enoplognatha diversa* (Blackwall, 1859). It should be noted here that another *Theridion* species in Koch's paper (*Theridion mansuetum*) appeared to be a junior synonym of *Enoplognatha mandibularis* (Lucas, 1846), see BOSMANS & VAN KEER (1999).

Distribution

Mediterranean, from the Iberian Peninsula and Morocco in the west, to Crete in the east.



Figs. 1-10: Fig. 1. Male palp of *Dysdera mordax* L. Koch, 1882 in L. KOCH (1882). Figs. 2-3: *Enoplognatha diversa* (Blackwall, 1859) 2. Epigyne of *Theridion elimatum* in KOCH (1882); 3. Epigyne of *Enoplognatha diversa* in BOSMANS & VAN KEER (1999). Figs. 4-5. *Oedothorax fuscus* (Blackwall, 1834). 4. Epigyne of *Erigone marina* in KOCH (1882). 5. Epigyne of *Oedothorax fuscus* in LOCKET & MILLIDGE (1953). Figs. 6-7: *Liocranum inornatum* (L. Koch, 1882). 6. Epigyne of *Zora inornata* in KOCH (1882); 7. Epigyne of *Liocranum variabilis* in WUNDERLICH (2008). Figs. 8-10: *Cheiracanthium occidentale* L. Koch, 1882. 8. Epigyne of *Cheiracanthium occidentale* in KOCH (1882). 9. Vulva, ventral view; 10. Idem, dorsal view.

Family Linyphiidae

Oedothorax fuscus (Blackwall, 1834) (Figs. 4-5)

Erigone marina L. Koch, 1882: 629, pl. 20, fig. 7 (descr. female); **new synonymy**.

Type material

Holotype female of *Erigone marina* from Spain, Balears, Mallorca, Soller, mid-April, Schaufuss leg. (ZMB 7915); examined.

Comments

Examination of the holotype clearly shows that this species is identical to *Oedothorax fuscus* (Blackwall, 1834) and thus *Erigone marina* becomes a junior synonym of that species. Koch's drawing of the epigyne (Fig. 4) is somewhat confusing but shows clearly the two typical curved lateral folds as in Fig. 5 taken from LOCKET & MILLIDGE (1953).

Distribution

Europe, North Africa, Azores, European part of Russia.

Family Liocranidae

Liocranum inornatum (L. Koch, 1882) new combination (Figs 6-7)

Zora inornata L. Koch, 1882: 639, pl. 20, fig. 19 (descr. female).

Liocranum variabilis Wunderlich, 2008: 506, figs 42-46 (descr. male, female); **new synonymy**.

Type material

Holotype female of *Zora inornata* from Spain, Balears, Mallorca, Miramare, IV.1866, Schaufuss leg. (ZMB 7920); examined.

Comparative material examined

SPAIN. Caceres: Plasencia, 1 female of *Liocranum majus* Simon, 1878, IV.1990, P. Poot leg. (CRB).

Comments

From Koch's drawing of the epigyne (1882, fig. 19) it is evident that this species does not belong in the genus *Zora*. The figure shows a large, anterior pocket and two smaller lateral pockets (Fig. 6). Examination of the specimen shows it to belong in the Liocranidae and that it is identical to *Liocranum variabilis*, only recently described from Mallorca by WUNDERLICH (2008), see Fig. 7. This latter species thus becomes a junior synonym. *Liocranum inornatum* is closely related to *L. majus* Simon, 1878, recently redescribed by LEDOUX (2008).

This author confirmed the synonymy of *L. majus* with *Liocranum apertum* Denis, 1954, *L. pallidulum* Simon, 1878 and *L. segmentatum* Simon, 1878. According to WUNDERLICH (2008), the helmet-like structure is larger in *L. major*.

Distribution

So far, the species is an endemic to Mallorca.

Family Miturgidae

Cheiracanthium occidentale L. Koch, 1882 (Figs. 8-10)

Cheiracanthium occidentale L. Koch, 1882: 637, pl. 20, fig. 16 (descr. female).

Type material

Holotype female of *Cheiracanthium occidentale* from Spain, Balears, Minorca, Mahon, 18.V.1866, Schaufuss leg. (ZMB 7929); examined.

Comments

KOCH's figure 16 (1882) clearly shows a *Cheiracanthium*-like epigyne (Fig. 8), but does not give enough diagnostic characters for identification. A redescription of the epigyne and vulva is therefore given here. According to the author, the species is related to *Cheiracanthium letochae* L. Koch, 1876 (= *C. elegans* Thorell, 1875). The epigyne has a median depression with an interior margin and is wider than

long. The spermathecae are relatively small, only 1/3 of the width of the depression. The copulatory openings are situated antero-laterally of the depression and the sperm ducts make three coils to the elongated spermathecae (Figs 9–10). In the literature, no species with such a vulva could be found and hence the species is considered valid.

Distribution

Only known from the type locality.

Family Lycosidae

Arctosa fulvolineata (Lucas, 1846) (Figs 11–12)

Lycosa perspicax L. Koch, 1882: 658, pl. 21, fig. 32 (descr. female); **new synonymy**.

Alopecosella perspicax; Roewer, 1955: 225.

Type material

Holotype female of *Lycosa perspicax* from Spain, Balears, Mallorca, Soller valley, mid-April, Schaufuss leg. (ZMB 7910); examined.

Comparative material examined

FRANCE. Aude: Gruissan, N. les Pujots (N 43°06'30" E 3°3'28"), 3m, 1 female, litter in salt marsh, 1.IV.1980, R. Bosmans leg. (CRB).

Comments

The holotype female has an intact epigyne and on examination it can immediately be recognised as *Arctosa fulvolineata*. *Lycosa perspicax* thus becomes a junior synonym. Koch's figure is sketchy (Fig. 7) but shows the typical antero-median, triangular septum of *A. fulvolineata* (Fig. 8, taken from KNÜLLE 1959). ROEWER (1955) created the new genus *Alopecosella* for this species. Since the type of the genus *Alopecosella* is here transferred to *Arctosa*, the genus *Alopecosella* becomes a junior synonym of *Arctosa*. The only other species of the genus *Alopecosella*, *A. pelusiaca* (Audouin, 1826) has to be returned to *Alopecosa*, where it was placed by CAPORIACCO (1936).

Distribution

Western Europe, Iberian Peninsula, Italy, south of France and the Maghreb.

Arctosa lacustris (Simon, 1876) (Figs 13–16)

Lycosa subhirsuta L. Koch, 1882: 653, pl. 21, figs 28–29 (descr. male, female); **new synonymy**.

Alopecosa subhirsutella Roewer, 1955: 221 (replacement name); **new synonymy**.

Lycosa subhirsuta; Roewer, 1960: 874 (transferred back, without arguments).

Type material

Lectotype male and paralectotype female of *Lycosa subhirsuta* from Spain, Balears, Soller valley, mid-April and Miramar, May, Schaufuss leg. (ZMB 7911); examined.

Comparative material examined

SPAIN. Caceres: Plasencia (N 40°1'52" E 6°5'18"), 525m, 1 male 1 female, IV.1990, P. Poot leg. (CRB).

Comments

The holotype male has only one palp left with a regular apophysis as in *Arctosa lacustris*. The female has an intact epigyne with a broad median septum, as clearly shown in Koch's figure 29 (1882), corresponding well with the epigyne of *A. lacustris* (compare Figs 13, 15 with Figs 14, 16 (taken from KNÜLLE 1959). *Lycosa subhirsuta* and its replacement name *Alopecosa subhirsutella* thus become junior synonyms of *Arctosa lacustris*.

Distribution

Mediterranean, Canary Islands.

Lycosa conspersa L. Koch, 1882 stat. rev. (Fig. 17)

Lycosa conspersa L. Koch, 1882: 661 pl. 21, fig. 33 (descr. female).

Trochosula conspersa; Roewer, 1955: 304.

Type material

Type series of two females of *Lycosa conspersa* from Spain, Balears, Mallorca, Ses Prat de San Jordi, end April, and Soller, mid-May, Schaufuss leg. (ZMB 7912); examined. The two females belong to different species. One of the females is *Arctosa fulvolineata*, the other one has an epigyne corresponding to the original drawing by KOCH (1882) and is selected here as the lectotype.

Comments

This species has not been mentioned since the original description, with the exception of ROEWER'S (1955) transfer to the genus *Trochosula*, without any justification. KOCH's figure 33 (1882) of the epigyne resembles the epigyne of *Hogna radiata* (Latreille, 1817), a widespread species in the Mediterranean. Like many large lycosids in the Mediterranean, this species complex is in need of revision and a conclusion about synonymy has to be postponed. Material from Mallorca is needed to resolve the situation. This is also the case for three other *Lycosa* species described by L. Koch from Mallorca (see below): *Lycosa fraissei*, *L. insulana* and *L. simplex*. They are all large species and Koch's figures 33–36 all show the same type of epigyne (see Figs 17–20). ROEWER (1955) transferred these species (without further justification) to three different genera: *Trochosula*, *Lycorma* and *Pirata*. To facilitate future studies, we consider it better to return them to their original genus. Topotypic material may help solve the identity of these problematic species.

Distribution

The type locality on Mallorca.

Lycosa fraisei L. Koch, 1882 stat. rev. (Fig. 18)

Lycosa fraisei L. Koch, 1882: 666, pl. 21, fig. 36 (descr. male).

Lycorma fraisei; Roewer, 1955: 265 (transfer).

Type material

Holotype male of *Lycosa fraisei* from Spain, Balears, Mallorca, Fraisse leg.; not examined, unavailable in ZMB.

Comments

A large lycosid of 19 mm total length. The type material is not available. See comments under *Lycosa conspersa*.

Distribution

The type locality on Mallorca.

Lycosa insulana L. Koch, 1882 stat. rev. (Fig. 19)

Lycosa insulana L. Koch, 1882: 664, pl. 21, fig. 35 (descr. female).

Lycorma insulana; Roewer, 1955: 265 (transfer).

Type material

Holotype female of *Lycosa insulana* from Spain, Balears, Mallorca, Fraisse leg.; not examined, unavailable in ZMB.

Comments

A large lycosid of 16 mm total length. The type material could not be examined. See comments under *Lycosa conspersa*.

Distribution

The type locality on Mallorca.

Lycosa misella L. Koch, 1882 nomen dubium

Lycosa misella L. Koch, 1882: 660 (descr. juvenile).

Arctosa misella; Roewer, 1955: 226 (transfer).

Type material

Juvenile holotype of *Lycosa misella* from Spain, Balears, Ses Prat de Jordi, end April, Schaufuss leg., not examined, unavailable in ZMB.

Comments

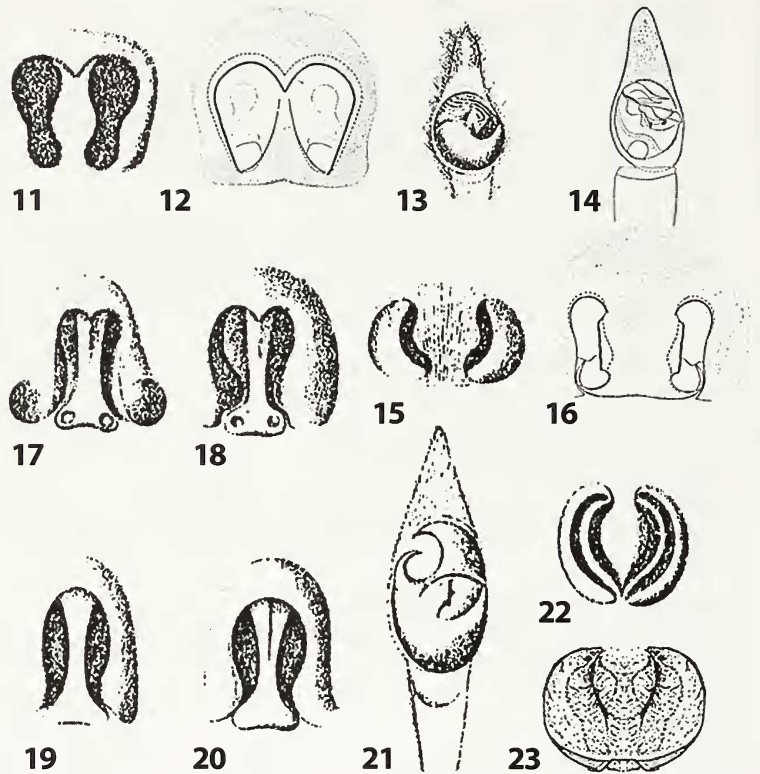
The holotype is a juvenile specimen and its status is unclear. *Lycosa misella* is therefore a *nomen dubium*.

Distribution

The type locality on Mallorca.

Lycosa simplex L. Koch, 1882 stat. rev. (Fig. 20)

Lycosa simplex L. Koch, 1882: 663, pl. 21, fig. 34 (descr. female).



Figs. 11-23. Figs. 11-12: *Arctosa fulvolineata* (Lucas, 1846). 11. Epigyne of *Lycosa perspicax* in KOCH (1882); 12. Epigyne of *Arctosa fulvolineata* in KNÜLLE (1959). Figs 13-16. *Arctosa lacustris* (Simon, 1876). 13. Male palp of *Lycosa subhirsuta* in KOCH (1882); 14. Male palp of *Arctosa lacustris* in KNÜLLE (1959); 15. Epigyne of *Lycosa subhirsuta* in KOCH (1882); 16. Epigyne of *Arctosa lacustris* in KNÜLLE (1959). Fig. 17. Epigyne of *Lycosa conspersa* in KOCH (1882). Fig. 18. Epigyne of *Lycosa fraisei* in KOCH (1882). Fig. 19. Epigyne of *Lycosa insulana* in KOCH (1882). Fig. 20. Epigyne of *Lycosa simplex* in KOCH (1882). Fig. 21. Male palp of *Pardosa tenuipes* in KOCH (1882). Figs 22-23. *Thanatus vulgaris* Simon, 1870. 22. Epigyne of *Philodromus vegetus* in KOCH (1882). 23. Epigyne of *Thanatus vulgaris* in SZITA & SAMU (2000).

Pirata simplex; Roewer, 1955: 284.

Type material

Holotype male of *Lycosa simplex* Spain, Balears, Palma city moats, begin May, and Ses Prat de Jordi, beginning of May, Schaufuss leg.; not examined, unavailable in ZMB.

Comments

The holotype could not be examined. According to the original description by KOCH (1882), it is a large species (23 mm) suggesting a lycosid genus encompassing larger species, such as *Hogna*, *Lycorma* or *Lycosa*. KOCH's (1882) figure of the epigyne does not look like a *Pirata* epigyne at all and the transfer proposed by ROEWER (1955) seems a random choice. See also comments under *Lycosa conspersa*.

Distribution

The type locality on Mallorca.

Pardosa tenuipes L. Koch, 1882 (Fig. 21)

Pardosa tenuipes L. Koch, 1882: 649, pl. 21, fig. 24 (descr. male).

Pardosops tenuipes; Roewer, 1955: 197.

Pardosa tenuipes; Tongiorgi, 1966: 351.

Type material

Holotype male of *Pardosa tenuipes* from Spain, Balears, Ses Prat de Jordi, mid-May, Schaufuss leg.; not examined, unavailable in ZMB.

Comments

ROEWER (1955) created the genus *Pardosops* for this and other species, but TONGIORGI (1966) synonymised it with *Pardosa*. The holotype male could not be examined. KOCH's (1882) figure 24 offers no indication of its affinities (see Fig. 21). Topotypic material is needed to clarify its systematic position.

Distribution

The type locality on Mallorca.

Family Philodromidae

Thanatus vulgaris Simon, 1870 (Figs 22-23)

Philodromus vegetus L. Koch, 1882: 645, pl. 20, fig. 22; **new synonymy.**

Type material

Holotype female of *Philodromus vegetus* from Spain, Balears, Mallorca, Miramare, begin May, Schaufuss leg.; not examined, unavailable in ZMB.

Comments

Figure 22 in KOCH (1882) shows a rounded epigynal plate with some concentric circles, typical for the epigyne of the common *Thanatus vulgaris* (compare Figs 22 and 23). This species has no less than eight synonyms in the Mediterranean region (LEVY 1977) and there is no doubt that *Philodromus vegetus* is yet another one.

Distribution

Circum-mediterranean.

Family Thomisidae

Ozyptila furcula L. Koch, 1882 (Figs 24-26)

Ozyptila furcula L. Koch, 1882: 648, pl. 21, fig. 23.

Ozyptila bicuspis Simon, 1932: 873, figs 1186-1187, 1208; **new synonymy.**

Type material

Holotype male of *Ozyptila furcula* from Spain, Balears, Mallorca, Ses Prat de San Jordi, end of April, Schaufuss leg.; not examined, unavailable in ZMB.

Comparative material examined

SPAIN. Jaen: Ribera Baja (N 37°26'58" E 3°50'5"), 870m, 1 male, litter in *Populus* forest, 6.IV.1997, R. Bosmans leg. (CRB).

Comments

The type material of this species is not available,

but KOCH's figure 21 (1882) allows a positive identification with respect to the tegular apophysis of specimens collected by us in Spain and North Africa. The tegulum has an oblique banana-shaped tegular apophysis with two postero-median concavities (compare Figs 24 and 25). Such an apophysis exists in three *Ozyptila* species occurring in this region: *O. pauxilla* Simon, 1870, *O. perplexa* Simon, 1875 and *O. bicuspis* Simon, 1932. Koch's species also has two postero-median incisions, and these are absent in *O. pauxilla* and *O. perplexa*. We consider *O. furcula* and *O. bicuspis* the same species and *O. bicuspis* Simon, 1932 becomes a junior synonym of *O. furcula* L. Koch, 1882. *Ozyptila pauxilla* and *O. perplexa* will be redescribed in a separate paper.

Distribution

The species is currently known from the south of France and from Spain.

Family Gnaphosidae

Haplodrassus parvicorpus (Roewer, 1951) new combination (Figs 27-28)

Drassus parvulus L. Koch, 1882: 632, pl. 20, fig. 10-11 (descr. male).

Drassus parvicorpus Roewer, 1951: 443 (replacement name).

Haplodrassus maroccanus Denis, 1956: 196, fig. 4-6; **new synonymy** (here removed from the synonymy of *H. dalmatensis* (L. Koch, 1866)).

Type material

Holotype male of *Drassus parvulus* from Spain, Balears, Mallorca, Riera near Palma, 22.IV.1882, Schaufuss leg. (ZMB 7913); examined.

Type series of *Haplodrassus maroccanus* from Morocco, Pr. Taroudant, Ouled Teima (= Houara), according to DENIS (1956) composed of 1 male 3 subadult males, 1 female 3 subadult females, 21.II.1954 and 1 subadult female from Amzou; not examined, not found in the MNHNP.

Comparative material examined

SPAIN. Cadiz: Tarifa (N 36°0'50" E 5°36'25"), 2 males 5 females, IV.1992, P. Poot leg. (CRB).

Comments

Drassus parvulus was described by KOCH (1882). Being preoccupied by *Drassus parvulus* Lucas, 1846, ROEWER (1951) offered *Drassus parvicorpus* as a replacement name. The species has never been cited since.

According to KOCH (1882), this species is related to *Drassus minusculus* (= *Haplodrassus dalmatensis*) and differs by the more arched prosoma with a black margin, and the disposition of the eyes, with the PM not touching and the AM separated by nearly their diameter. These characters are too variable in *Haplodrassus*

to distinguish species, but Koch's figure 10 (1882) shows a male palp with a large, subterminal tooth on the tegular apophysis, and his figure 11 shows a palpal tibia with an apophysis as long as wide (Fig. 27). The male palps of the holotype male are both present and in good condition (Fig. 28). Examination shows that they are identical to the palps of *Haplodrassus maroccanus*, described from Morocco by DENIS (1956) and occurring all over the south-western Mediterranean (unpublished data). In *H. dalmatensis*, the tegular apophysis has only a small subterminal tooth, and the tibial apophysis is shorter than wide; thus there are sufficient diagnostic characters to separate the species. *Haplodrassus maroccanus* Denis, 1956 becomes a junior synonym of *H. parvicorpus* (Roewer, 1951 n. comb.). The synonymy of *H. maroccanus* with *H. dalmatensis*, proposed by LEVY (2004) is rejected. The species will be fully redescribed in a further paper.

Distribution

Mallorca and Morocco.

Zelotes callidus (Simon, 1878) (Figs 29–35)

Prosthesima callida Simon, 1878: 91 (descr. male, non female = *Z. caucasicus*).

Prosthesima semirufa L. Koch, 1882: 636, pl. 20, fig 15 (descr. female); **new synonymy**.

Zelotes callidus; Simon, 1882: 37 (descr. male, non female); Simon, 1914: 219 (descr. male, non female).

Zelotes ruscinensis Simon, 1914: 157, 169, fig. 259, 346 (descr. male, female); Senglet, 2004: 104, figs 47–50 (descr. male, female); **new synonymy**.

Zelotes circumspetus; Denis 1935: 117 (descr. female); misidentification.

Zelotes lugens Denis 1941: 162 (correction of the citation of *Z. circumspetus* from 1935); Di Franco 1997: 258 (synonymy by SENGLLET 2004).

Zelotes adolescentulus Denis 1952: 118 (synonymy by SENGLLET 2004).

Zelotes massiliensis Soyer, 1967: 278 (synonymy by SENGLLET 2004).

Zelotes semirufus; Senglet, 2011: 518, figs 2–17, 74 (synonym with *Z. ruscinensis*).

Type material

Holotype male of *Prosthesima* (= *Zelotes*) *callida* from Corsica, Ajaccio (MNHNP, not examined).

Holotype female of *Prosthesima* (= *Zelotes*) *semirufa* from Spain, Balears, Menorca, Braun leg.; not examined, unavailable in ZMB.

Holotype female of *Zelotes lugens* from France, Var, Vallon de Port Cros (MNHNP, examined).

Holotype male of *Zelotes adolescentulus* from Morocco, Skhirat (MNHNP, examined).

Comparative material examined

SPAIN. Cáceres: Torrejon el Rubio (N 39°46'15" W

6°4'12"), 270m, 4 males 2 females, pitfalls, 15.VII–23.VIII.1996, U. Stengele leg. (CRB); Talavan, Finca el Baldio (N 39°43'12" W 6°19'4"), 370m, 10 males 2 females, pitfalls, 10.VII–5.IX.1996, U. Stengele leg. (CRB). Granada: Santa Fè (N 37°11'31" W 3°45'17"), 700m, 1 female, litter in irrigated *Populus* forest, 9.VIII.1991, R. Bosmans leg. (CRB). Malaga: Coin, along Rio Grande N 36°41'29" W 4°48'22"), 110m, 1 female, stones in grassland, 15.VII.1991, R. Bosmans leg. (CRB). Murcia: Puerto Lumbreras (N 37°29'37" W 1°51'9"), 530m, 1 female, under stone, 14.VII.1991, R. Bosmans leg. (CRB). – ALGERIA. Oran: Mers el Hadjad (N 35°47'52" W 0°9'51"), 2 males, litter in garden, IX.1988, R. Bosmans leg. (CRB). – MOROCCO. Essaouira: Ounara E. (N 31° 32'33" W 9°30'47"), 250m, 1 male, stones in gar-ganier steppe, 8.VII.1999, R. Bosmans leg. (CRB).

Comments

The discovery of large series of *Zelotes callidus* in central Spain – including males and females – allows us to resolve a complicated case of synonymy. The males from Central Spain could be identified as *Zelotes callidus*, based on the original figures of SIMON (1878, fig. 23; 1914, figs 297–299); a species originally described from Corsica. Characteristic are the two anterior teeth in the bulb, compare Figs 32–33). The females did not correspond with Simon's figures of *Z. callidus*, which corroborates the observation of SENGLLET (2004) that the females described as *Z. callidus* by SIMON (1878, fig. 24; 1914, fig. 354), JÉZÉQUEL (1962, fig. 29) and LEDOUX (1972, fig. 1) all illustrate the epigyne or vulva of *Zelotes caucasicus* (L. Koch, 1866).

The females from Central Spain could be identified as *Zelotes semirufus* (L. Koch, 1882) described from Menorca. KOCH's figure of *Zelotes semirufus* (Fig. 29) shows an epigyne with a median plate that is slightly longer than wide, with an open posterior margin, and comparable position of the rounded spermathecae (Fig. 30).

Perhaps the mismatching of the sexes of *Z. callidus* confused Simon in 1878, because in 1914, he described the species again from the south of France as *Z. ruscinensis*. Recently, this latter species was re-described by SENGLLET (2004); who further pointed out that *Zelotes adolescentulus* Denis, 1952, *Z. lugens* Denis, 1941 and *Z. massiliensis* Soyer, 1967 are its junior synonyms. All of these taxa now enter into the synonymy of *Zelotes callidus*.

Distribution

Recorded from Morocco, Algeria, Spain, Portugal, France and Italy. DRENSKY (1915) cited the species erroneously from Bulgaria; it was in fact *Zelotes caucasicus*.

Zelotes plumiger (L. Koch, 1882)
(Fig. 36)

Prosthesima plumigera L. Koch, 1882:
630, pl. 20, figs 12, 13.

Type material

Holotype male of *Prosthesima* (= *Zelotes*) *plumigera* from Spain, Balears, Mallorca, Ses Prat de San Jordi, end of April, Schaufuss leg.; not examined, unavailable in ZMB.

Comments

According to KOCH (1882), this species measures 5 mm and the prosoma is brownish black, the abdomen yellowish brown, the legs reddish brown with red femora and the spinnerets yellowish brown. The prosoma is shiny, and covered with long, plumose hairs, hence presumably the specific name '*plumiger*'. Koch's figure (Fig. 36) shows a palp with the bulb tapering to the top, a terminal tooth (the embolus?) and a retrolateral, curved apophysis (terminal apophysis?). The affinities of the species are presently unknown, but most probably it does not belong in the genus *Zelotes*. *Gnaphosa artaensis* Wunderlich, 2011 from Mallorca has a very similar palp but there are not enough elements to consider it conspecific with *Zelotes plumiger*. Further investigation on the island could reveal the identity of Koch's species.

Distribution

Only known from the type locality.

Family Salticidae

Phlegra bresnieri (Lucas, 1846) (Figs 37-38)

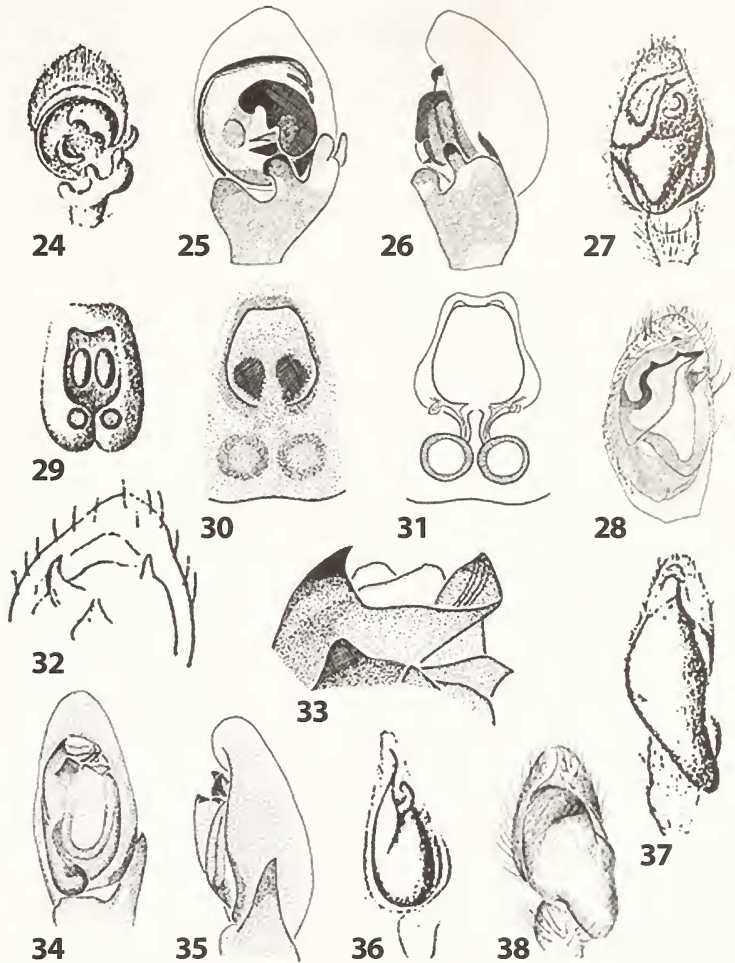
Phlegra simoni L. Koch, 1882: 667, pl. 21, fig. 37 (descr. female); **new synonymy**.

Type material

Holotype female of *Phlegra simoni* from Spain, Balears, Minorca, Riera near Palma, 30 May 1872, Schaufuss leg. (ZMB 7932); examined.

Comparative material examined

GREECE. Attiki: Enoce ruins near Marathon (N 38°9'13" E 23°56'33"), 180 m, 3 males, stones in maquis, 19.IV.2000, R. Bosmans leg. (CRB).



Figs. 24-38. Figs. 24-26: *Ozyptila furcula* L. Koch, 1882. 24. Male palp of *Ozyptila furcula* in KOCH (1882); 25. Male palp, ventral view; 26. Idem, lateral view. Figs. 27-28: *Haplodrassus parvicorpus* (Roewer, 1951). 27. Male palp of *Drassus parvulus* in KOCH (1882). 28. Male palp of *Haplodrassus parvicorpus*, specimen from Tarifa. Figs. 29-35: *Zelotes callidus* (Simon, 1878). 29. Epigyne of *Zelotes semirufus* in KOCH (1882); 30. Epigyne of *Zelotes callidus*, specimen from Talavan; 31. Vulva; 32. Male palp of *Zelotes callidus* in SIMON (1914, fig. 298); 33. Male palp, detail; 34. Male palp, ventral view; 35. Male palp, lateral view; Fig. 36. Male palp of *Zelotes plumiger* L. Koch, 1882 in L. KOCH (1882). Figs. 37-38 *Phlegra bresnieri* (Lucas, 1846). 37. Male palp of *Phlegra simoni* in L. KOCH (1882); 38. Male palp of *Phlegra bresnieri* in METZNER (1999).

Comments

The holotype female could be examined. The dorsal stripes on the prosoma and abdomen have disappeared, but the clypeus is densely covered with white hairs. The long, threadlike embolus is clearly visible and its placement in the genus *Phlegra* is thus confirmed. According to KOCH (1882), *Phlegra simoni* differs from *P. bresnieri* in the male palpal tibia which bears black hairs. Examination of some specimens of *P. bresnieri* from our collection show that the femora

and patellae have white hairs, but only black ones on the tibiae (cfr. SIMON, 1876: 121: “Patte-mâchoire, au moins la patella et le femur, garnie en dessus de poils blancs”). As the palps are otherwise identical (Figs 37, 38), the two species are here synonymised.

Distribution

Southern Europe to Azerbaijan, Ivory Coast, Tanzania.

Conclusions

Taxonomic studies by earlier arachnologists are of variable quality, but until there is proof to the contrary, they all have to be considered valuable. Some authors working on Mediterranean spiders in the past – for instance (but not exclusively) LUCAS (e.g. 1846), O. P.-CAMBRIDGE (e.g. 1872, 1876) and KULCZYŃSKI (e.g. 1908, 1911) – presented detailed descriptions accompanied by excellent figures of the general appearance and sexual organs, making identification very easily possible. In most cases, however, examination of the type material is necessary to come to a definitive conclusion. Other authors gave long, very detailed descriptions but presented no figures at all; like for instance PAVESI (e.g. 1880, 1884) and the numerous papers by THORELL (e.g. 1875) and STRAND (e.g. 1906, 1908). Here, recognition of the species is not possible without examining the original type material. However, even if these species are not instantly recognizable, their names remain valid until has been stated in a publication that the types are not available; like for instance many types of Strand destroyed in the last World War.

In the case of the study by L. KOCH (1882) on the spiders of the Balearic Islands, the paper includes good drawings, in many cases making identification possible. Only ten of the 28 described species were redescribed previously, resulting in three valid names and seven synonyms. Type material of ten of the remaining 18 species could be examined by us. Five of these nine species names are valid: *Cheiracanthium occidentale*, *Dysdera mordax*, *Liocranum inornatum* n. comb. and *Haplodrassus parvicorpis* n. comb. Four out of the nine species appeared to be synonyms of species described earlier. *Erigone marina*, *Lycosa perspicax*, *Lycosa subhirsuta* and *Phlegra simoni* are the junior synonyms of *Oedothorax fuscus*, *Arctosa fulvolineata*, *Arctosa lacustris* and *Phlegra fasciata* respectively. Finally, *Trochosula conspersa* is retransferred to its original genus, *Lycosa*, where it awaits further study.

Of the eight species whose types could not be examined, the drawings of L. Koch were care-

fully studied and three species could be recognized. *Ozyptila furcula* was recognized and redescribed. *Philodromus vegetus* and *Theridion elimatum* were recognized as junior synonyms of *Thanatus vulgaris* and *Enoplognatha diversa* respectively. *Lycosa fraisei*, *L. insulana*, *L. simplex* and *Pardosa tenuipes* could not be recognized and are left in their original genus. Finally *Lycosa misella* is declared a nomen nudum, since the description was based on a juvenile specimen.

Acknowledgements

Benjamin Nitsche and Jason Dunlop (ZMB) are thanked for the loan of the material described by L. Koch from the Balears. Antony Russell-Smith is thanked for a final review of the paper and Heiko Metzner and Jörg Wunderlich for permission to use their figures.

References

- BOSMANS R. & J. VAN KEER (1999): The genus *Enoplognatha* Pavesi, 1880 in the Mediterranean region (Araneae: Theridiidae). – Bulletin of the British arachnological Society 11: 209-241
- BOSELAERS J., C. URONES, J.A. BARRIENTOS & J.M. ALBERDI (2009): On the Mediterranean species of Trachelinae (Araneae, Corinnidae) with a revision of *Trachelas* L. Koch, 1872 on the Iberian Peninsula. – Journal of Arachnology 37: 15-38 – doi: 10.1636/A08-33.1
- BRAUN R. (1965): Beitrag zu einer Revision der paläarktischen Arten der *Philodromus aureolus*-Gruppe (Arach., Araneae). I. Morphologisch-systematischer Teil. – Senckenbergiana biologica 46: 369-428
- CAPORACCO L. di (1936): Aracnidi fezzanesi raccolti dal prof. G. Scortecci nel 1934-XII. (Missione della R. Società geografica). – Atti della Società italiana di scienze naturali 75: 67-93
- DECAE A. & P. CARDOSO (2006): *Iberesia*, a new genus of trapdoor spiders (Araneae, Nemesiidae) from Portugal & Spain. – Revista Ibérica de Aracnología 12: 3-11
- DENIS J. (1935): Additions à la faune arachnologique de l'île de Port-Cros (Var). – Annales de la Société d'Histoire naturelle de Toulon 19: 114-122
- DENIS J. (1952): Quelques araignées de l'île de Cabrera et remarques sur la faune des Baléares. – Bulletin de l'Institut royal de Sciences naturelles de Belgique 28(25): 1-4
- DENIS J. (1956): Spiders collected in French Morocco by the Durham Colleges Expedition Club. – Proceedings of the Zoological Society of London 126: 275-281 – doi: 10.1111/j.1096-3642.1956.tb00437.x
- DRENSKY P. (1915): Araneides nouveaux ou peu connus de Bulgarie. – Spisanié na bulgarskata Akademiya na Naikite. 12: 141-176

- JÉZÉQUEL J.F. (1962): Contribution à l'étude des *Zelotes* femelles (Araneida [sic], Labidognatha, Gnaphosidae) de la fauna française (2e note). – Bulletin du Muséum d'Histoire naturelle, Paris 33: 594-610
- KNÜLLE W. (1959): Über italienische *Arctosa*-Arten (Araneae: Lycosidae). – Archivio zoologico italiano, Napoli 45: 251-270
- KOCH L. (1882): Zoologische Ergebnisse von excursionsen auf den Balearen. II: Arachniden und Myriapoden. – Verhandlungen der zoologisch-botanischen Gesellschaft in Wien 31: 625-678
- KULCZYŃSKI W. (1908): Fragmenta arachnologica. X. – Bulletin international de l'Académie des sciences de Cracovie 1908: 49-86
- KULCZYŃSKI W. (1911): Fragmenta Arachnologica. XVI, XVII. – Bulletin international de l'Académie des sciences de Cracovie 1911: 12-75
- LEDOUX J.-C. (1972): Notes d'aranéologie. 2. Quelques captures intéressantes dans le Sud-Est de la France. – Bulletin de la Société d'Etude des Sciences Naturelles du Vaucluse 1970-1972: 93-95
- LEDOUX J.-C. (2008): *Liocranum apertum* Denis 1954 = *L. majus* Simon, 1878? – Revue arachnologique 17: 87-88
- LEVY G. (2004): Spiders of the genera *Drassodes* and *Haplodrassus* (Araneae, Gnaphosidae) from Israel. – Israel Journal of Zoology 50: 1-37 – doi: 10.1560/RUQP-20ML-VDBA-3GKX
- LOCKET G.H. & A.F. MILLIDGE (1953): British spiders, Volume 2. Ray Society, London. 310 pp.
- LUCAS H. (1846): Histoire naturelle des animaux articulés. In Exploration scientifique de l'Algérie pendant les années 1840, 1841, 1842 publiée par ordre du Gouvernement et avec le concours d'une commission académique. – Paris, Sciences physiques, Zoologie 1: 89-271
- LUGETTI G. & P. TONGIORGI (1965): Revisione delle specie italiane dei generi *Arctosa* C. L. Koch e *Tricca* Simon con note su una *Acantholycosa* delle Alpi Giulie (Araneae-Lycosidae). – Redia 49: 165-229
- MERRETT P. & R.G. SNAZELL (1975): New and rare British spiders. – Bulletin of the British arachnological Society 3: 106-112
- METZNER H. (1999): Die Springspinnen (Araneae, Salticidae) Griechenlands. – Andrias 14: 1-279
- PAVESI P. (1880): Studi sugli Aracnidi africani. I. Aracnidi di Tunisia. – Annali del Museo Civico di Storia Naturale di Genova 15: 283-388
- PAVESI P. (1884): Materiali per lo studio della fauna tunisina raccolti da G. e L. Doria: Aracnidi – Annali del Museo Civico di Storia Naturale di Genova 20: 446-486
- ROEWER C.F. (1942): Katalog der Araneae von 1758 bis 1940. Band 1. Kommissionsverlag von "Natura", Bremen. 1040 pp.
- ROEWER C.F. (1951): Neue Namen einiger Araneen-Arten. – Abhandlungen des naturwissenschaftlichen Vereins Bremen 32: 437-456
- ROEWER C.F. (1955): Katalog der Araneae von 1758 bis 1940, bzw. 1954. Band 2. Institut Royal des Sciences Naturelles de Belgique, Bruxelles., 1751 pp.
- ROEWER C.F. (1960): Araneae Lycosaeformia II (Lycosidae) (Fortsetzung und Schluss). – Exploration du Parc national de l'Upemba. Mission G. F. de Witte 55: 519-1040
- SENGLLET A. (2004): Copulatory mechanisms in *Zelotes*, *Drassyllus* and *Trachyzelotes* (Araneae, Gnaphosidae), with additional faunistic and taxonomic data on species from southwest Europe. – Mitteilungen der schweizerischen entomologischen Gesellschaft 77: 87-119
- SENGLLET A. (2011): New species in the *Zelotes tenuis*-group and new or little known species in other *Zelotes* groups (Gnaphosidae, Araneae). – Revue suisse de Zoologie 118: 513-559
- SIMON E. (1870): Aranéides nouveaux ou peu connus du midi de l'Europe. – Mémoires de la Société royal scientifique, Liège (2) 3: 271-358
- SIMON E. (1876): Les arachnides de France, tome 3. Roret, Paris. 364 pp.
- SIMON, E. (1878): Les arachnides de France, tome 4. Roret, Paris. 334 pp.
- SIMON E. (1914): Les arachnides de France. Synopsis générale et catalogue des espèces françaises de l'ordre des Araneae. Tome VI. 1re partie. Roret, Paris. pp. 1-308
- SIMON E. (1932): Les arachnides de France. Tome VI. Synopsis générale et catalogue des espèces françaises de l'ordre des Araneae. Tome VI. 4e partie. Roret, Paris. pp. 773-978
- SOYER B. (1967): Contribution à l'étude éthologique et écologique des araignées de la Provence occidentale. IX. Sur quelques araignées du genre *Zelotes* Gistel. – Bulletin de la Société entomologique de France 72: 275-281
- STRAND E. (1906): Diagnosen nordafrikanischer, hauptsächlich von Carlo Freiherr von Erlanger gesammelter Spinnen. – Zoologischer Anzeiger 30: 604-637, 655-690
- STRAND E. (1908): Nordafrikanische Spinnen, hauptsächlich von Carlo Freiherr von Erlanger gesammelt (Dictynidae, Erisidae, Sicariidae, Dysderidae, Caponiidae, Palpimanidae, Zodariidae, Uroctidae, Pholcidae, Agelenidae, Pisauridae). – Archiv für Naturgeschichte 74(1): 67-128, Taf. II
- SZITA É. & F. SAMU (2000): Taxonomical review of *Thanatus* species (Philodromidae, Araneae) of Hungary. – Acta Zoologica Academiae Scientiarum Hungaricae 46: 155-179
- THORELL T. (1875): Verzeichniss südrussischer Spinnen. – Horae Societatis entomologicae Rossicae 11: 39-122

- TONGIORGI P. (1966): Wolf spiders of the *Pardosa monticola* group (Araneae: Lycosidae). – Bulletin of the Museum of Comparative Zoology 134: 335-359
- URONES C. (2005): El género *Zora* C.L. Koch 1847 (Arachnida, Araneae, Zoridae) en la Península Ibérica. – Revista Ibérica de Aracnología 11: 7-22.
- WUNDERLICH J. (1984): Seltene und bisher unbekannte Wolfspinnen aus Mitteleuropa und Revision der *Pardosa saltuaria*-Gruppe (Arachnida: Araneae: Lycosidae). – Verhandlungen des Naturwissenschaftlichen Vereins in Hamburg 27: 417-442
- WUNDERLICH J. (2008): On extant and fossil spiders (Araneae) of the RTA-clade in Eocene European ambers of the families Borboropactidae, Corinnidae, Selenopidae, Sparassidae, Trochanteriidae, Zoridae s. l., and of the superfamily Lycosoidea. – Beitrage zur Araneologie 5: 470-523
- WUNDERLICH J. (2011): Taxonomy of extant and fossil (Eocene) European ground spiders of the family Gnaphosidae (Araneae), with a key to the genera, and descriptions of new taxa. – Beitrage zur Araneologie 6: 19-97